

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

DANIEL A. JAPUNTICH ET AL.

Serial No.: 08/240,877

Filed: May 11, 1994

For: FILTERING FACE MASK THAT HAS A NEW
EXHALATION VALVE

Group Art Unit: 3761

Examiner: A. Lewis

AFFIDAVIT OF DAVID M. CASTIGLIONE

I, David M. Castiglione, swear as follows:

1. That I am presently a product development engineer at 3M Company in St. Paul, Minnesota.
2. That I received a Bachelor of Science degree in Materials Engineering from the Rensselaer Polytechnic Institute. I received this degree in May of 1990. I also have a Masters of Science degree in Materials from the University of California at Santa Barbara. I received this degree in 1992.
3. That I began work at the 3M Company in St. Paul, Minnesota after receiving my Masters of Science degree from the University of California. I began work with 3M in the ~~Automotive Engineered Systems~~ Division and worked in that division through September of 1993.
4. That I began work for the Occupational Health & Environmental Safety Division (OH&ES) in October of 1993 and continue to work in that division at the present time. My work with the OH&ES division has entailed the design and development of respirators and respirator components. That I have filed five United States patent applications for the OH&ES Division since I began employment with this business unit. The five patent applications include three utility patent applications and two design patent applications.

EXHIBIT C

5. That I am familiar with U.S. Patent Application Serial No. 08/240,877 filed May 11, 1994. I have read the specification and claims in this patent application and also have read the Decision of the Board of Patent Appeals and Interferences' Decision on Appeal mailed September 14, 1999.

6. That I understand that the Board has held that subject matter of independent claims 18 and 24 to be unpatentable based on the disclosures in U.S. patents 2,320,770 to Cover and 3,191,618 to McKim. I further understand that the Board has concluded "that it would have been further obvious to one of ordinary skill in the art at the time the invention was made to have modified Cover's valve 46 to be attached to the modified valve seat outside a region encompassed by a single opening/orifice as suggested by the teachings of McKim to permit the valve seat to quickly, effectively, and without bounce after each opening thereof (sic)."

7. That I have read U.S. Patents 2,320,770 and 3,191,618, and I do not believe that the combination of Cover and McKim would have led a person of ordinary skill in the art to the present invention because the McKim patent is not pertinent to the subject matter sought to be patented in U.S. Patent Application Serial No. 08/240,877. Nor do I believe that the McKim disclosure is pertinent to the subject matter described in Cover. I do not believe that the McKim patent satisfies the legal criteria for being art analogous to the invention claimed in U.S. Patent Application Serial No. 08/240,877.

8. That my review of the McKim patent shows a curved seat reed valve that is designed for use in a high-speed engine, which would turn at speeds as high as 10,000 or 12,000 revolutions per minute. The reed valve described in McKim is particularly suited for a high speed operation where opening and closing forces are large. These forces can cause the valve to bounce (an elastic recoil from impact). The stated goals in McKim are full rapid opening, quick and complete closing, and eliminating float and bounce. The curved seat reed valve described in McKim is an intake valve for a two-stroke engine. The valve operates when the piston in the engine's cylinder moves from a top dead center to a bottom dead center, and the pressure within the crankcase is reduced below atmospheric pressure to overcome the spring bias of the valve reed. The valve then opens and remains open until the difference in these pressures is reduced sufficiently to allow the spring bias of the reed to return to its seat.

9. That the subject matter of the '877 invention, as I understand it, pertains to a filtering face mask that has a mask body adapted to fit over the nose and mouth of a person and also includes an exhalation valve that is attached to the mask body. The exhalation valve comprises a valve seat that has an orifice through which a fluid can pass and that has a seal ridge that circumscribes the orifice and has a concave curvature when viewed from a side elevation. The flexible flap has a first portion that is attached to the valve seat outside a region encompassed by the orifice. A second portion of the flexible flap assumes a concave curvature of the seal ridge when the valve is in a closed position and is free to be lifted from the seal ridge when a fluid is passing through the orifice.

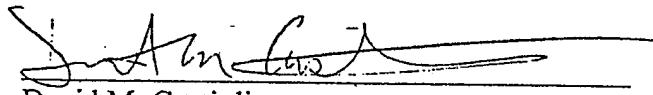
10. That the field of the '877 invention pertains to a filtering face mask that employs an exhalation valve. A filtering face mask is worn over the nose and mouth of a person for filtering contaminants that may be present in the ambient air. Filtering face masks commonly employ exhalation valves to allow more moist exhaled air to be rapidly purged from the mask interior. The exhalation valves are used to improve wearer comfort. These valves operate at normal room temperatures and low pressures. The field of endeavor for a filtering face mask is very different from the field of endeavor of a curved seat reed valve that is used in a high-speed engine. Persons of ordinary skill in the field of designing filtering face masks do not consult documents that describe valves for gasoline engines in developing respiratory products. Exhalation valves for respirators operate under very different conditions from valves that are used in gasoline engines and require extraordinarily different design parameters.

11. That in exhalation valves for filtering face masks, the speed of opening is not a primary design parameter. There is no incumbent need to rapidly fill or exhaust a combustion chamber. Further, at the airflows and pressure drops that are encountered in a respiratory mask, "bounce" is not an occurring event. Investigators in the exhalation valve art for filtering face masks seek to produce exhaust valves that minimize force to open from the normally closed position. This particular design parameter is not compatible with fast-closing valves that require high forces for rapidly opening and closing. The flow volumes and flap stiffnesses are orders of magnitude higher for valves used in combustion engines as opposed to valves that are used on respiratory masks. For these reasons, a person of ordinary skill in the filtering face mask art

would not have found the McKim patent to be reasonably pertinent to the problems that are encountered in the development of an exhalation valve for a filtering face mask.

12. That the curved seat reed valve described in the McKim patent does not have the same purposes as the exhalation valve that is used in the present invention and that the McKim reed valve does not relate to the same problem that has been encountered in designing the filtering face mask of U.S. Patent Application 08/240,877. The reed valve described in the McKim patent is too remote to be pertinent to the subject matter sought to be patented in U.S. Patent Application 08/240,877.

13. That U.S. Patent 2,320,770 to Cover describes a respirator, which is designed to be worn by a person for purposes of preventing the wearer from inhaling airborne contaminants. The reed valve described in McKim would not be applied to the Cover respirator for the reasons recited above, particularly because a person of ordinary skill in the respirator art would not consult a document pertaining to a valve for a high speed gasoline engine when looking to modify a respirator or an exhalation valve for a respirator.



David M. Castiglione

Subscribed and sworn to before me
this 15th day of November, 1999.



Renee A. Johnson

Notary Public

